

REMARKS

This application has been carefully reviewed in light of the Office Action dated August 6, 2007. Claims 1-20 remain in this application. Claim 1 is the independent Claim. Claims 8 and 19 have been amended. New Claim 20 has been added. It is believed that no new matter is involved in the amendments or arguments presented herein. Reconsideration and entrance of the amendment in the application are respectfully requested.

Art-Based Rejections

Claims 1-19 were rejected under 35 U.S.C. § 103(a) over European Patent Publication No. EP 1 014 766 A2 (Takahashi) in view of European Patent Publication No. EP 0 335 337 A2 (Watanabe). Applicant respectfully traverses the rejections and submits that the claims herein are patentable in light of the clarifying amendments above and the arguments below.

The Takahashi Reference

Takahashi is directed to a flexible board including a metal foil provided with a laminated three layer polyimide resin structure (*See Takahashi; Paragraph [0009]*).

The Watanabe Reference

Watanabe is directed to resin layers of low and high thermal expansion coefficients (*See Watanabe; Page 3, lines 5-15, Page 4, lines 24-34 and Page 6, lines 26-47*).

The Claims are Patentable Over the Cited References

The present application is generally directed to a bonding sheet that can be bonded with a metal foil.

As defined by independent Claim 1, a bonding sheet includes an adhesive layer containing a thermoplastic resin disposed on one side of a heat resistant film and a non-adhesive layer containing a thermoplastic resin and a thermoplastic resin disposed on the other side of the heat resistant film.

The applied references do not disclose or suggest the features of the present invention as defined by independent Claim 1. In particular, the applied references do not disclose or suggest, "[a] bonding sheet comprising an adhesive layer containing a thermoplastic resin disposed on one side of a heat resistant film and a non-adhesive layer containing a non-thermoplastic resin and a thermoplastic resin disposed on the other side of the heat resistant film," as required by independent Claim 1.

Thermoplastic resin is typically provided to exhibit thermoplasticity or thermal adhesiveness when applied with heat. However, in the present invention, the thermoplastic resin provided for the non-adhesive layer does not provide the non-adhesive layer with thermoplasticity or thermal adhesiveness. Instead, the thermoplastic resin is provided to control the linear expansion coefficient of the non-adhesive layer.

Due to this structure in the non-adhesive layer, adhesion is prevented in the rolls and the like during the lamination, while the adhesiveness to the heat resistant film is secured and the linear expansion coefficient of the non-adhesive layer is adjusted to substantially the same level as the linear expansion coefficient of the adhesive layer. Thus, a good balance of linear expansion coefficient between the adhesive layer and the non-adhesive layer is attained.

In contrast, neither Takahashi nor Watanabe discloses the use of the thermoplastic resin with the non-thermoplastic resin in the non-adhesive layer and furthermore cause a problem in the thermal lamination of a bonding sheet with a copper foil, as discussed below.

Takahashi discloses a three layer bonding sheet. However, Takahashi does not disclose the nature of each layer. The disclosure of paragraph [0031] provides the addition of a heat resistant resin to any layer of 2a, 2b, 2c, but does not disclose the use of the thermoplastic resin as in the present invention. Furthermore, Applicant respectfully submits that the Examiner has misconstrued the present invention by stating on page 2 of the Office Action that non-thermoplastic resin may be added to any of the polyimide layers, presumably in an effort to influence such parameters as the thermal expansion properties of the layer. In contrast, the present invention adds the thermoplastic resin to the non-thermoplastic resin such that the layer exhibits non-thermoplastic properties.

Moreover, Watanabe does not disclose the thermal lamination of polyimide resin layers by a thermal roll laminator, but instead teaches a laminate produced by casting the polyimide resin or its precursor on a copper foil. Therefore, adhesion to the rolls of the thermal laminator during lamination does not occur. Therefore, Watanabe merely discloses the three layer bonding sheet. There is no disclosure of the thermoplastic resin provided with the non-thermoplastic resin. The description on page 6, line 41-43 which is relied on in the rejection, neither discloses the combination of the thermoplastic resin and the non-thermoplastic resin nor the control of the linear expansion coefficient of the non-adhesive layer. Applicant respectfully submits that one of ordinary skill in the art avoids blending with another polyimide, especially the blending of a thermoplastic polyimide with the non-thermoplastic polyimide, since it is a complicated process. Furthermore, new Claim 20 is characterized in that the non-adhesive layer is obtained by applying a mixture of a precursor of non-thermoplastic resin and a thermoplastic resin or its precursor on the heat resistant film. This method requires the preparation of two different polyamic acid (or polyimide) solutions.

Although Watanabe discloses the thermal lamination of polyimide resin layers by thermal roll laminator (*See Watanabe; Page 6, line 47*), the problem of the exposed

adhesive layer becoming adhered to the thermal roll does not occur, since a surface of the hot laminate roll does not touch the resin side.

Thus, Takahashi and Watanabe do not disclose or suggest this feature of the present invention as required by independent Claim 1.

Since the applied references fail to disclose, teach or suggest the above features recited in independent Claim 1, those references cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, independent Claim 1 is believed to be in condition for allowance and such allowance is respectfully requested.

The remaining claims depend either directly or indirectly from independent Claims 1 and recite additional features of the invention which are neither disclosed nor fairly suggested by the applied references and are therefore also believed to be in condition for allowance.

Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 785-4721 to discuss the steps necessary for placing the application in condition for allowance.

Appl. No. 10/541,081
Amdt. Dated February 6, 2008
Reply to Office Action of August 6, 2007

Attorney Docket No. 81844.0040
Customer No.: 26021

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: February 6, 2008

By:



Dariush G. Adli
Registration No. 51,386
Attorney for Applicant(s)

1999 Avenue of the Stars, Suite 1400
Los Angeles, California 90067
Phone: 310-785-4600
Fax: 310-785-4601